Practical Cost-Estimating and Validation
Lessons Learned Workshop
Additional Lessons Learned Questions

Project Scope

___ Is the project scope available?

Does the scope reflect/address

- ___ All available site information?
- ___ Technical approach?
- ___ Regulatory requirements?
- ___ Cost- and schedule-control opportunities?

Does the project/task scope include

- ___ Description of the work to be performed?
- ___ End condition or end product of work?
- ___ Performance criteria and requirements?
- ___ Discrete tasks and deliverables?
- ___ Performance methodology and task plans?

___ Are the major assumptions used in developing the project scope clearly identified and justified in the documentation? (The ground rules and assumptions may be identified in documents separate from the estimate.)

___ Does the documentation include the rationale used to develop task descriptions, logic diagrams, milestones, and resource requirements?

___ Does the project scope documentation include specific activities associated with the work to be performed and activity-based resource descriptions?

___ Does the project scope documentation include descriptions of support activities (e.g., health and safety, quality assurance, security) associated with the work to be performed?

Project Scope

___ Has the project scope been developed at the lowest possible level of Work Breakdown Structure (WBS)/Code of Accounts (COA)?

___ Do the U.S. Department of Energy (DOE) and contractor management place a strong emphasis on project/task scope?

___ Do the individuals responsible for preparing cost estimates place a strong emphasis on project scope?

___ Are project scopes formally updated?

___ Are update logs used? What information is provided in these logs?

___ Can the project scope be traced back to the original authors/reference materials? How?

___ Does the project scope assign responsibilities?

___ Does the project scope reflect the project/task WBS elements?

___ Is there a WBS activity dictionary?

___ As appropriate, does the project scope contain a technical logic diagram and/or process flow diagram?

___ How is the scope creep addressed in cost estimates? Does everyone consider this issue? How should it be addressed?

___ What part does cost estimating play in technology evaluation? What part should it play? How are new innovative technologies estimated? What kinds of potential improvements are possible?

Schedules

___ Are the organizational units that perform the schedule-estimating functions identified on the organizational chart?

___ Do formal directives/procedures define the schedule-estimating authorization, implementation, review, and approval processes?

___ Does management support the formal scheduling process as defined by current directives?

___ Is the formally defined schedule-estimating process followed?

___ Has a critical path schedule been developed? Does it consider the following?

- ___ Security restraints?
- ___ Regulatory requirements and permits?
- ___ Effects of legislation (e.g., Clean Air Act, Clean Water Act, Endangered Species Act, National Historic Preservation Act?

Have the following factors been considered in developing project schedules (typically applicable to projects at the pre-construction stage):

- ___ Mandated schedule and milestones?
- ___ Budget-cycle timing?
- ___ Headquarters reviews and approvals?
- ___ Historical site characterization?
- ___ Phased approach?
- ___ Logical sequence of design, procurement, and construction?
- ___ Procurement lead time for equipment/contractors?
- ___ Reasonable manpower levels, buildup, and ramp-down?
- ___ Facility limitations?
- ___ Shift work or overtime work requirements?

Schedules

___ Safety requirements?

___ Exposure constraints?

___ Future regulations and policies?

___ Availability of nonfinancial resources?

___ Uncertainty of demand?

___ Climate?

___ Bonding and liability issues?

___ Patent and intellectual property issues?

___ Availability of funding?

___ Others?

___ Are schedules updated or revised as external factors change?

___ Have the possible effects of schedule delays been taken into consideration on interdependent projects?

Change Control

___ Has responsibility been assigned for ensuring that a feedback system is in place and is used to inform cost estimators of any changes?

___ Is there a comprehensive feedback system in place? Is it

- ___ Formal?
- ___ Informal?

___ Is it being used?

___ Are final project costs collected and compared with original estimates?

___ Are cost data from ongoing and completed projects collected and maintained as a resource for improving cost estimation?

Contracting

___ Do procedures require the participation of cost estimators in the selection of the contract vehicle?

___ Are the procedures followed?

___ Do procedures require the participation of cost estimators in the development/selection of standard and special contract clauses?

___ Are the procedures followed?

___ Is there a feedback procedure to ensure that cost estimators review and ascertain the cost impact of all clauses used in the contract?

___ Is it used?

___ Are estimates prepared (or reviewed) by cost estimators before bid opening and contract negotiation?

Contracting

Do cost estimators have responsibility for preparation, review, and/or approval for the following? If not, who does?

___ Contract vehicle selection?

___ Specification preparation?

___ Contract clause development/selection?

___ Schedule?

___ Bid evaluation?

___ Negotiations?

___ Award?

Contract Changes

___ Do procedures stipulate that all contract modifications, including the negotiation of cost and schedule, require the participation of the cost estimator?

___ Are the procedures practiced?

___ Do procedures require an estimate to be prepared before opening a proposal for contract modifications?

___ Are the procedures practiced?

Scope Revision

___ Is a system in place to ensure timely distribution of the latest version of design criteria, design documents, and contract documents to the cost and schedule estimators?

___ Is it used?

___ Is there a process in place that involves the cost and schedule estimators in project cost and schedule updates?

___ Is it used?

___ Are cost and schedule estimates routinely updated?

Cost Estimate Safeguard

___ Is there a process in place to ensure that estimates are safeguarded after completion?

Is the process followed for

___ Estimates?

___ Budget estimates?

___ Is there a list of personnel authorized to have prior knowledge of access to the formal estimate?

___ Is the access list current and filed with the estimate?

___ Is there a secure system (e.g., locking cabinets, safes, password-protected computer files) to safeguard the integrity of the estimates and supporting documentation and information?

___ Is it used and controlled?

Work Breakdown Structure

___ Is there a WBS activity dictionary?

___ If so, does it provide detailed descriptions for each element?

___ Is there a schedule associated with each element?

___ Does the estimate breakdown follow the WBS activity?

___ Is the estimate developed at the appropriate WBS level?

___ Do all of the estimates associated with the scope of work reference their own WBS activity dictionary or COA dictionary?

___ Is there a consistent application of the WBS?

___ Is a database structured around the WBS to track costs and provide estimation data?

Risk

___ Do procedures require a cost and schedule risk analysis to be performed on every program/project/task?

___ How well do you need to understand the risk analysis to apply cost estimates?

___ Is a cost and schedule risk analysis performed on each program/project/task?

___ Is there dialogue between the individuals performing the cost and schedule risk analyses/contingency estimates and other appropriate personnel (e.g., management, budgeting, technical)?

___ Are quantitative methods used to conduct risk analyses? Identify the methods.

___ Are they automated?

___ Are the contingency estimates a direct result of the risk analysis process?

___ Is there a clear understanding of responsibility for performing and coordinating cost and schedule risk analyses?

___ Are cost and schedule risk levels and contingency estimates clearly documented and appropriately entered into the cost estimate?

___ Is there a separate risk identification and tracking system in place?

___ Is it used?

___ Is there a formal procedure for doing cost and schedule risk analysis calculations?

___ Does this procedure also generate contingency-fund estimating requirements?

___ Are feasibility study cost estimates identified but not performed? What can be done to prevent this oversight?

General

___ Did the staff responsible for preparing the estimate demonstrate a thorough understanding of the project work and its schedule?

___ Was the cost-estimating function allocated sufficient time and resources for each estimate?

___ Has the project/task purpose been defined?

___ Does the project/task purpose reflect an adequate level of detail?

___ Is there documentation (e.g., thorough reviews) of a clear understanding of project requirements/specifications?

___ Have the roles of DOE, other contractors, and subcontractors been defined?

___ Are site-specific conditions/requirements identified?

___ Are all job-related documents referenced and available for review?

___ Is there a planning checklist to ensure that planning is handled systematically?

___ Has a detailed project schedule been established?

___ Is the detailed project schedule available for review?

___ Is there documentation available to ensure that all requirements, schedules, and conditions are current?

___ Are there references to other functional elements?

___ Have all related functional elements been identified?

___ Has coordination with these elements been achieved?

___ Have ground rules and assumptions been defined?

Cost Estimate Evaluation

___ Are Life Cycle Cost Analysis (LCCAs) required?

___ Is a process in place to ensure that LCCAs are performed on a timely basis for project planning?

___ Do the procedures ensure involvement of cost estimators in the LCCA process?

___ Are the procedures followed?

___ Does the process produce LCCAs that are comprehensive and that address project alternatives?

___ Are LCCAs reviewed and approved?

Value Engineering

___ Is there an implementing order in the DOE Operations Office requiring value engineering studies in accordance with DOE Order 4010.1, Executive Order 12615, FAR 48.102C, and FAR 52.248.1?

___ Is the implementing order followed?

___ Are value engineering studies a formal requirement for the project design/approval process?

___ Does the value engineering process require full participation of cost estimators?

___ Are cost estimators participating members of the study team?

Requirements for Cost Estimate

Are there directives concerning authority and responsibility for formal approval of cost estimates at

___ DOE offices?

___ Other contractor offices?

___ Have formal criteria been developed to determine the points in the project development sequence (MSA and MPs) that require formal DOE and contractor management review and approval of cost and schedule estimates?

___ Are directives available, effectively distributed and current?

___ Are they used?

___ Are personnel aware of how the directives affect their participation in the review and approval process?

___ Do personnel follow the appropriate directives?

___ Have requirements for the contents of a cost- and schedule-review package been defined?

Procedures

___ Are there procedures to involve cost and schedule estimators in the development of DOE positions on agreements (e.g., compliance and interagency)?

___ Is there a procedure to ensure that cost and schedule estimators receive feedback on results and subsequent amendments?

___ Are these procedures used?

___ Are these procedures effective?

___ Do these procedures involve the management and operating/national laboratory estimators in cost and schedule negotiations with their subcontractors? Are these procedures used and effective? Is independence maintained?

___ Cost estimating is an art rather than an exact science. How does this affect in its success or failure?

Miscellaneous

___ Is the review process documented with well-defined levels of responsibility and (signature) authority?

___ Are responsibilities properly assigned?

___ Are ICEs prepared, reviewed, and approved at appropriate times?

___ Does the practice of review, approval, and forwarding of cost estimates follow the process documented?

Cost Estimate Documentation

___ Is the supporting documentation complete and reasonable?

___ Are analyses fully documented?

___ Are cost-element considerations reasonable and documented?

Is the estimate

___ Clear?

___ Accurate?

___ Does the estimate identify and properly include subcontracting costs?

___ Are indirects identifiable?

___ Are indirects applied in accordance with site accounting methods?

___ Do indirect cost application and estimator knowledge ensure that there is no duplication or apparent "double-dipping"? [Note: Provide copies of estimate summary sheet(s) showing indirect markups to the Indirects subteam for review.]

___ For the estimates reviewed, was a cost estimate performed to evaluate the reasonableness of prime and subcontractor proposals?

___ Is a log of coordination efforts and contacts maintained?

___ Have historical cost and schedule data been collected, maintained, and used in preparing these estimates?

___ Have historical costs and data been properly adjusted?

___ Were previous estimates available and used?

___ If used, were they reconciled?

___ Were proper inflation factors applied (constant-year dollars to midpoint of each work element, such as assessment, design, construction, cleanup, operations, and maintenance)?

___ Are present-value estimates required?

Quality Control

___ Is a formal quality control process in place for reviewing cost and schedule estimates?

___ Is a defined process in place for resolving problems encountered during review and for maintaining the quality of the cost and schedule estimates?

___ Is concurrence of the cost or schedule estimator required when the cost or schedule estimate is changed?

___ Are reviewers prohibited from changing the cost estimate? (The cost estimate should be sent back to the cost estimator for reestimating.)

___ Are all review comments, including design, returned to the cost estimator for cost impact?

___ Are estimating assumptions documented and included in the quality control review package?

___ Is an independent schedule review made?

___ Is a procedure in place to compare estimates to historical data from analogous projects?

___ Is a procedure in place to address estimates rejected because of poor quality? How is the modified estimate processed?

___ Is there a procedure in place, such as peer review, to ensure that all estimates are logical to other estimators and their supervisors?

___ If an estimate is only partially done, how is this fact conveyed to others?

Contingency

___ Does the estimate include a contingency allowance?

___ Is contingency separately identified and included?

___ Is the contingency allowance adequately described in the estimate narrative?

Project Schedule Development

___ Does the project schedule reflect a clear and complete understanding of the scope of work?

___ Does the schedule reflect an accurate knowledge of resource availability and construction methods?

___ Is the project schedule commensurate with the cost estimate and resource allocations?

___ Is the project schedule updated and maintained as the project is further developed?

___ Is a log maintained to record updates and revisions?

___ Are scheduling tools available?

___ Are they used?

___ Is there an allowance for schedule slips?

___ Are there milestone description sheets?

Appendix H: Additional Lessons-Learned Questions